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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/803,319	03/09/2001	Daniel G. Anderson	0492611-0392 (MIT-9128)	5731

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EXAMINER
SHIBUYA, MARK LANCE

ART UNIT	PAPER NUMBER
1639	

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DATE MAILED: 02/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/803,319	ANDERSON ET AL.	
	Examiner	Art Unit	
	Mark L. Shibuya	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-58* is/are pending in the application.

4a) Of the above claim(s) *7,12-14,21-56 and 58* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-11,15-20 and 57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/6/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-58. Currently, claims 7, 12-14, 21-56 and 58 are withdrawn from consideration. Claims are examined 1-6, 8-11, 15-20 and 57 are examined.

Withdrawn Claim Rejections

2. The rejection of claims 1-6, 8-11, 14-20 and 57 under 35 USC 112, second paragraph, is withdrawn in view of applicant's amendments to the claims, filed 12/06/2004.

3. The rejection of claims 1-6, 8-11, 14-20 and 57 under 35 USC 112, first paragraph, is withdrawn in view of applicant's amendments to the claims, filed 12/06/2004.

4. The rejection of claims 1-6, 8-11, 14-20, and 57 under 35 U.S.C. 103(a) as being unpatentable over Saltzman et al. (J. Biomed. Mat. Res., Vol. 25, pp. 741-759, 1991) in view of Kapur et al., (US 6,548,263) and Shultz et al. (US 5,985,356), is withdrawn in view of applicant's arguments, filed 12/06/2004.

Continued Examination Under 37 CFR 1.114

5. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/06/2004 has been entered.

Election/Restrictions

6. The Requirement for Restriction/Election, mailed 7/10/2002 is maintained, as well as applicant's election, filed 7/18/2002, of Group I (originally claims 1-20) and species (non covalent, chemical adsorption; glass; homopolymers of methacrylic esters, poly(2-hydroxy-ethylmethacrylate); further comprising a compound, a non-covalently bound drug; and synthetic polymers, polyhydroxyacids). The elections were treated as without traverse in the Office action mailed 10/28/2002.

Claims 7, 12-14, 21-56 and 58 were withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected Groups and species, there being no allowable generic or linking claim (see, e.g., previous Office action, mailed 9/7/2004). Upon consideration, claim 14 is withdrawn as drawn to an unelected species. Currently, claims 7, 12-14, 21-56 and 58 are withdrawn from consideration.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

7. The citations of US No. 5552270, 5985356 and 6548263 and WO 98/16380 are duplicative and have been crossed out on the form IDS, filed 12/6/2004, attached herewith. US Applications No.s 10/843,707 and 10/941,390, have been considered but are crossed out on the form IDS, filed 16/2004, attached herewith.

NEW REJECTIONS

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-5, 8-11 and 15-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al., US 6,699,665.

The claims are drawn to a microarray of polymeric biomaterials comprising: a base comprising a cytophobic surface, and a plurality of discrete dry non-monolayer polymeric biomaterial elements non-covalently bound to said cytophobic surface, wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers.

Kim et al., throughout the patent and especially at col. 4, line 58-col. 5, line 38, teach a microarray of polymeric biomaterials comprising a base (including metal, glass, polystyrene, and polycarbonate), and teach a cytophobic surface, wherein the base is polymethylacrylate, which absent evidence to the contrary, is a hydrogel, as in claim 5, (specification at col. 6, lines 24-49); and an array of biomolecules that include molecules having a specific reactivity toward a particular surface, the remainder of the molecule

being typically a hydrocarbon chain, which can be hydrophobic, cytophobic, or biophobic and is generated onto an substrate as a self-assembled monolayer (col. 9, lines 4-40) by direct coupling or by micro-contact printing; and, at col. 15, lines 45-67, teach an array of biomolecules prepared from solution of proteins ("e.g., 100 different proteins from a library) using an ink-jet; and at col. 8, lines 3-23, teach reactions (including ionic interaction, binding events, hydrophobic interaction, hydrogen bond formation, etc.) of the biomolecules, (including proteins, nucleic acids or chemical entities) with a substrate (which reads on a plurality of discrete, dry non-monolayer polymeric biomaterial elements non-covalently bound to said cytophobic surface), wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers, as claimed). Kim et al. at col. 7, lines 29-33, teach polymeric biomaterial elements ranging from 1 micron to about 1 mm, (as in claims 15 and 16); and at col. 7, lines 13-18, teach intervals measuring 1 cm to about 0.5 cm to about 0.25 cm distances, (as in claims 17 and 18). Kim at col. 10, lines 19-28, teach over 2,000 array elements in the area of a standard well of a 96-well plate (approximately mm^2), which absent evidence to the contrary, read on claims 19 and 20, reciting limitation of 1 to 1000 or 10-100 polymeric biomaterial elements per cm^2.

In regards to the limitation that the microarray be comprised of dry polymeric biomaterial elements, it is noted that in the examples of the instant application, microarrays with dry polymeric elements are placed into (cell) medium, so that at the time of use, the polymeric elements are not taught in the specification as dry. As it does

not appear to be structurally necessary that the microarray be composed of dry polymeric elements in order to function, it appears that the claims are product by process claims. Furthermore, the specification does not teach that dry polymeric elements have structural limitations not found in wet polymeric elements. Thus the microarrays taught by Kim et al., absent evidence to the contrary, do not differ in a structural or otherwise meaningful way from the microarrays of the claimed invention.

In regards to the limitation that the polymeric biomaterial elements include different soluble synthetic polymers, it is note that the specification does not disclose how synthetic polymers of poly(amino acids) differ from proteins, or proteins libraries. Absent evidence to the contrary, the proteins and protein libraries as taught by Kim et al. do not differ from synthetic polymers of poly(amino acids).

9. Claims 2-5, 9-11, 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Johnson et al., US 6,372,813 (IDS filed 12/06/2004).

The claims are drawn to a microarray of polymeric biomaterials comprising: a base comprising a cytophobic surface, and a plurality of discrete dry non-monolayer polymeric biomaterial elements bound to said cytophobic surface, wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers.

Johnson et al., throughout the patent and at col. 1, line 6-col. 2, line 47, teach polyacrylamide hydrogel arrays to which biological molecules, including DNA, RNA, peptides and proteins, are attached by covalent bonds. Johnson et al. at col. 4, line 58-

col. 6, line 50, teach that hydrogels include polymethylacrylate, poly ethylene oxide (as in claims 4 and 5); teach that the solid support may be glass or plastics including polystyrene and polypropylene; and teach that the biomolecules that are attached to the hydrogel can be DNA, including synthetic nucleic acids, peptides, polypeptide, oligopeptides or proteins and any modification thereof. John teach hydrogel microlocations in an array that are each from about 5 to 500 microns.

In regards to the limitation that the microarray be comprised of dry polymeric biomaterial elements, it is noted that in the examples of the instant application, microarrays with dry polymeric elements are placed into (cell) medium, so that at the time of use, the polymeric elements are not taught in the specification as dry. As it does not appear to be structurally necessary that the microarray be composed of dry polymeric elements in order to function, it appears that the claims are product by process claims. Furthermore, the specification does not teach that dry polymeric elements have structural limitations not found in wet polymeric elements. Thus the microarrays taught by Johnson et al., absent evidence to the contrary, do not differ in a structural or otherwise meaningful way from the microarrays of the claimed invention.

In regards to the limitation that the polymeric biomaterial elements include different soluble synthetic polymers, it is note that the specification does not disclose how synthetic polymers of poly(amino acids) differ from proteins, peptides, polypeptide, or oligopeptides. Absent evidence to the contrary, the proteins as taught by Johnson et al. do not differ from synthetic polymers of poly(amino acids).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-6, 8-11, 15-20, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schultz et al., US 5,985,356**, (IDS filed 3/11/2003); **Sheu et al.**, (J. Adhesion Sci. Technol., 1992, Vol. 6, No. 9, pp. 995-1009); **Kapur et al., US 6,548,263**, (previously cited by examiner, 11/21/2003); and **Koob et al., US 20030204023**.

The claims are drawn to a microarray of polymeric biomaterials comprising: a base comprising a cytophobic surface, and a plurality of discrete dry non-monolayer polymeric biomaterial elements non-covalently bound to said cytophobic surface, wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers and wherein the cytophobic surface comprises poly(2-hydroxy-ethyl methacrylate).

Schultz et al. (US 5,985,356), throughout the patent, teach microarrays of polymeric biomaterials comprising: a base (including metals and glass) comprising a cytophobic surface, and a plurality of discrete dry non-monolayer polymeric biomaterial elements that include polyurethanes, polycarbonates, polystyrene, (col. 7, lines 34-56; col. 11, line 41-col. 12, line 5; and as in instant claim 11) non-covalently bound to said surface, wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers. Schultz et al., at col. 4, lines 30-46, teach that an array of materials on a single substrate can consist of more that 10, more than 100, more than 1000 materials, and so fourth. Schultz et al. at col. 33, lines 14-51, and Figure 9, teach synthesis of an array of 16 different organic polymers of styrene and acrylonitrile and initiator, wherein the monomers are delivered by ink-jet dispenser; upon completion of polymerization on the substrate, the organic solvent is removed by evaporation *in vacuo*, which reads upon dry polymeric biomaterial elements. Schultz et al., at col. 11, line 41-col. 12, line 5, teach arrays of diverse materials at known locations on a single substrate surface and teach that the substrates can be coated with a material different from the base, and state that "[t]he most appropriate substrate and substrate-surface materials will depend on the class of materials to be synthesized and the selection in any given case will be readily apparent to those of skill in the art." Schultz et al., at col. 15, lines 18-65, also teach thin-film deposition techniques. Schultz et al. at col. 12, lines 6-34, teach regions that are less than 1,000 μm^2 (as in claims 15 and 16). Schultz et al., at col. 23, lines 35-48, disclose that spacing between the

individual regions will vary in accordance with the sized of the regions used, for example, if a 1 mm^2 region is used, the spacing will be on the order of 1 m or less. If a 10 μm^2 region is used, then the spacing will be on the order of 10 μm. Thus the intervals as claimed in claims 17 and 18 are within the ranges taught by Schultz et al. At col. 4, lines 30-47, Schultz et al. teach 1 to 10 to 100 to 1000 to 10,000 regions/cm^2, so that if one compound is polymerized on one region, then the density of polymeric biomaterial elements per cm^2 is encompasses the ranges claimed in claims 19 and 20.

Schultz et al. (US 5,985,356), does not disclose microarrays of polymeric biomaterials comprising a base comprising a cytophobic surface, wherein polymeric elements are bound to the cytophobic surface; and wherein at least one of said polymeric biomaterial elements further comprise a small molecule drug. Schultz et al. do not disclose a microarray of polymeric biomaterials comprising: a base comprising a cytophobic surface and wherein the cytophobic surface comprises poly(2-hydroxy-ethyl methacrylate).

Sheu et al., (J. Adhesion Sci. Technol., 1992, Vol. 6, No. 9, pp. 995-1009), throughout the publication and especially in the abstract, p. 995, para 1-p. 996, para 1, teach non-fouling surfaces, including surfaces containing poly(ethylene glycol) (PEG) or poly(ethylene oxide) (PEO) that show high surface wettability and low affinity for proteins and cells. Sheu et al., at p. 998, teach dip-coating surfaces to deposit PEO surfactants.

Kapur et al., (US 6,548,263), throughout the patent, and especially at col. 41, line 43-col. 43, line 6, teach arrays of various sizes, rendering array surfaces repulsive

for cellular adhesion, in order to pattern cell attachment and growth on a surface; and Kapur et al. teach using hydrogel as a cytophobic surface. Kapur et al., at, e.g., col. 18, line 60-col. 19, line 65, especially col. 19, line 48, teach that various cell binding, marker and other molecules can be used in the arrays, including "drugs".

Koob et al., US 20030204023, at para [0155] teach that poly(2-hydroxy-ethyl methacrylate) is a cell attachment inhibitor.

It would have been *prima facie* obvious at the time the invention was made, for one of ordinary skill in the art to have made microarrays of polymeric biomaterials comprising a base comprising a cytophobic surface, and polymeric elements that are bound to the cytophobic surface; wherein the cytophobic surface comprises poly(2-hydroxy-ethyl methacrylate); and wherein at least one of said polymeric biomaterial elements further comprise a small molecule drug.

One of ordinary skill in the art would have been motivated to have made microarrays of polymeric biomaterials comprising a base comprising a cytophobic surface, and wherein polymeric elements are bound to the cytophobic surface, in order to avoid following of substrates by protein and cells and to control the patterns of cell growth on substrates. Schultz et al. teach that the practitioner may select a substrate upon which to generate a polymeric array, depending upon the material to be synthesized; Sheu et al., teach that the synthesis of cytophobic surfaces coated with PEG or PEO so as to prevent fouling by proteins and cells; and Kapur et al. using multiple layers of cell adhesive and cell repulsive surfaces to control the pattern of cell growth on surface. One of ordinary skill in the art would have been motivated to make

cytophobic surface that comprises poly(2-hydroxy-ethyl methacrylate) because Koob et al. teach poly(2-hydroxy-ethyl methacrylate) is cytophobic.

One of ordinary skill in the art would have had a reasonable expectation of success in combining the teachings of Schultz et al., Sheu et al., and Kapur et al., because Sheu et al. and Koob et al. taught cytophobic surfaces, including poly(2-hydroxy-ethyl methacrylate), were well known in the art at the time the invention was made; and because polymerization on substrates is taught by Schultz et al.

11. Claims 1-6, 8-11, and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kim et al., US 6,699,665**; and **Koob et al., US 20030204023**.

The claims are drawn to a microarray of polymeric biomaterials comprising: a base comprising a cytophobic surface, and a plurality of discrete dry non-monolayer polymeric biomaterial elements non-covalently bound to said cytophobic surface, wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers and wherein the cytophobic surface comprises poly(2-hydroxy-ethyl methacrylate).

Kim et al., US 6,699,665, throughout the patent and especially at col. 4, line 58-col. 5, line 38, teach a microarray of polymeric biomaterials comprising a base (including metal, glass, polystyrene, and polycarbonate), and teach a cytophobic surface, wherein the base is polymethylacrylate, which absent evidence to the contrary, is a hydrogel, as in claim 5, (specification at col. 6, lines 24-49); and an array of

biomolecules that include molecules having a specific reactivity toward a particular surface, the remainder of the molecule being typically a hydrocarbon chain, which can be hydrophobic, cytophobic, or biophobic and is generated onto an substrate as a self-assembled monolayer (col. 9, lines 4-40) by direct coupling or by micro-contact printing; and, at col. 15, lines 45-67, teach an array of biomolecules prepared from solution of proteins ("e.g., 100 different proteins from a library) using an ink-jet; and at col. 8, lines 3-23, teach reactions (including ionic interaction, binding events, hydrophobic interaction, hydrogen bond formation, etc.) of the biomolecules, (including proteins, nucleic acids or chemical entities) with a substrate (which reads on a plurality of discrete, dry non-monolayer polymeric biomaterial elements non-covalently bound to said cytophobic surface), wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers, as claimed). Kim et al. at col. 7, lines 29-33, teach polymeric biomaterial elements ranging from 1 micron to about 1 mm, (as in claims 15 and 16); and at col. 7, lines 13-18, teach intervals measuring 1 cm to about 0.5 cm to about 0.25 cm distances, (as in claims 17 and 18). Kim at col. 10, lines 19-28, teach over 2,000 array elements in the area of a standard well of a 96-well plate (approximately mm^2), which absent evidence to the contrary, read on claims 19 and 20, reciting limitation of 1 to 1000 or 10-100 polymeric biomaterial elements per cm^2.

In regards to the limitation that the microarray be comprised of dry polymeric biomaterial elements, it is noted that in the examples of the instant application, microarrays with dry polymeric elements are placed into (cell) medium, so that at the

time of use, the polymeric elements are not taught in the specification as dry. As it does not appear to be structurally necessary that the microarray be composed of dry polymeric elements in order to function, it appears that the claims are product by process claims. Furthermore, the specification does not teach that dry polymeric elements have structural limitations not found in wet polymeric elements. Thus the microarrays taught by Kim et al., absent evidence to the contrary, do not differ in a structural or otherwise meaningful way from the microarrays of the claimed invention.

In regards to the limitation that the polymeric biomaterial elements include different soluble synthetic polymers, it is note that the specification does not disclose how synthetic polymers of poly(amino acids) differ from proteins, peptides, polypeptide, or oligopeptides. Absent evidence to the contrary, the proteins and protein libraries as taught by Kim et al. do not differ from synthetic polymers of poly(amino acids).

Kim et al. do not disclose a microarray of polymeric biomaterials comprising: a base comprising a cytophobic surface and wherein the cytophobic surface comprises poly(2-hydroxy-ethyl methacrylate).

Koob et al., US 20030204023, at para [0155] teach that poly(2-hydroxy-ethyl methacrylate) is a cell attachment inhibitor.

It would have been *prima facie* obvious at the time the invention was made, for one of ordinary skill in the art to have made microarrays of polymeric biomaterials comprising a base comprising a cytophobic surface and wherein the cytophobic surface comprises poly(2-hydroxy-ethyl methacrylate).

One of ordinary skill in the art would have been motivated to have made microarrays of polymeric biomaterials comprising a base comprising a cytophobic surface and wherein the cytophobic surface comprises poly(2-hydroxy-ethyl methacrylate) because Koob et al., teach poly(2-hydroxy-ethyl methacrylate) is a cell attachment inhibitor.

One of ordinary skill in the art would have had a reasonable expectation of success in making and using cytophobic surfaces that comprise poly(2-hydroxy-ethyl methacrylate) because poly(2-hydroxy-ethyl methacrylate) is a hydrogel.

12. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Kim et al., US 6,699,665**; and **Kapur et al., US 6,548,263**, (previously cited by examiner, 11/21/2003).

The claims are drawn to a microarray of polymeric biomaterials comprising: a base comprising a cytophobic surface, and a plurality of discrete dry non-monolayer polymeric biomaterial elements non-covalently bound to said cytophobic surface, wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers and wherein at least one of said polymeric biomaterial elements further comprise a small molecule drug.

Kim et al., US 6,699,665, throughout the patent and especially at col. 4, line 58-col. 5, line 38, teach a microarray of polymeric biomaterials comprising a base (including metal, glass, polystyrene, and polycarbonate), and teach a cytophobic

surface, wherein the base is polymethylacrylate, which absent evidence to the contrary, is a hydrogel, as in claim 5, (specification at col. 6, lines 24-49); and an array of biomolecules that include molecules having a specific reactivity toward a particular surface, the remainder of the molecule being typically a hydrocarbon chain, which can be hydrophobic, cytophobic, or biophobic and is generated onto an substrate as a self-assembled monolayer (col. 9, lines 4-40) by direct coupling or by micro-contact printing; and, at col. 15, lines 45-67, teach an array of biomolecules prepared from solution of proteins ("e.g., 100 different proteins from a library) using an ink-jet; and at col. 8, lines 3-23, teach reactions (including ionic interaction, binding events, hydrophobic interaction, hydrogen bond formation, etc.) of the biomolecules, (including proteins, nucleic acids or chemical entities) with a substrate (which reads on a plurality of discrete, dry non-monolayer polymeric biomaterial elements non-covalently bound to said cytophobic surface), wherein each of said polymeric biomaterial elements includes a soluble synthetic polymer, and at least two of said polymeric biomaterial elements include different soluble synthetic polymers, as claimed). Kim et al. at col. 7, lines 29-33, teach polymeric biomaterial elements ranging from 1 micron to about 1 mm, (as in claims 15 and 16); and at col. 7, lines 13-18, teach intervals measuring 1 cm to about 0.5 cm to about 0.25 cm distances, (as in claims 17 and 18). Kim at col. 10, lines 19-28, teach over 2,000 array elements in the area of a standard well of a 96-well plate (approximately mm^2), which absent evidence to the contrary, read on claims 19 and 20, reciting limitation of 1 to 1000 or 10-100 polymeric biomaterial elements per cm^2.

In regards to the limitation that the microarray be comprised of dry polymeric biomaterial elements, it is noted that in the examples of the instant application, microarrays with dry polymeric elements are placed into (cell) medium, so that at the time of use, the polymeric elements are not taught in the specification as dry. As it does not appear to be structurally necessary that the microarray be composed of dry polymeric elements in order to function, it appears that the claims are product by process claims. Furthermore, the specification does not teach that dry polymeric elements have structural limitations not found in wet polymeric elements. Thus the microarrays taught by Kim et al., absent evidence to the contrary, do not differ in a structural or otherwise meaningful way from the microarrays of the claimed invention.

In regards to the limitation that the polymeric biomaterial elements include different soluble synthetic polymers, it is note that the specification does not disclose how synthetic polymers of poly(amino acids) differ from proteins, peptides, polypeptide, or oligopeptides. Absent evidence to the contrary, the proteins and protein libraries as taught by Kim et al. do not differ from synthetic polymers of poly(amino acids).

Kim et al. do not disclose a microarray of polymeric biomaterials comprising: a base comprising a cytophobic surface and wherein at least one of said polymeric biomaterial elements further comprise a small molecule drug.

Kapur et al., US 6,548,263, at, e.g., col. 18, line 60-col. 19, line 65, especially col. 19, line 48, teach that various cell binding, marker and other molecules can be used in the arrays, including "drugs".

It would have been *prima facie* obvious at the time the invention was made, for one of ordinary skill in the art to have made microarrays of polymeric biomaterials comprising a base comprising a cytophobic surface and wherein at least one of said polymeric biomaterial elements further comprise a small molecule drug.

One of ordinary skill in the art would have been motivated to have made microarrays of polymeric biomaterials comprising a base comprising a cytophobic surface and wherein the cytophobic surface and wherein at least one of said polymeric biomaterial elements further comprise a small molecule drug, because Kapur et al., teach testing and interacting cells with small drug molecules on arrays.

One of ordinary skill in the art would have had a reasonable expectation of success in making arrays that comprised small drug molecules, because the attachment of small organic molecules to polymers was well known in the art.

Conclusion

13. Claims 1-6, 8-11, 15-20 and 57 are rejected. Claims 7, 12-14, 21-56 and 58 remain withdrawn from consideration.

14. The art made of record and not relied upon is considered pertinent to applicant's disclosure: Mao et al., US 6,844,028.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shibuya whose telephone number is (571) 272-0806. The examiner can normally be reached on M-F, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272-0811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner
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